

**CALL NO. 08-2
FOR PROFESSIONAL SERVICES
TO BE PROVIDED TO THE
CITY OF SANTA CLARA, CALIFORNIA
BY SUMMIT BLUE CONSULTING, LLC**

The Parties to this Call No. 08-2 ("Call") agree that on this _____ day of _____, 2008, this Call is made pursuant to the terms of a Call Agreement between the Parties entitled, "Call Agreement by and Between the City of Santa Clara, California and Summit Blue Consulting, LLC," dated March 18, 2008, the terms of which are incorporated by this reference. This Call describes the Services to be provided to the City of Santa Clara, California ("City") by Summit Blue Consulting, LLC ("Contractor"), which are more fully described in Contractor's proposal to City entitled "2008 Energy Efficiency Program Evaluation Plan" dated August 14, 2008 ("Proposal"), attached to this Call as Exhibit A and incorporated by this reference. The Services to be performed under this Call shall be completed within the time period beginning on October 1, 2008, and ending on January 30, 2009. The attached Proposal contains a complete description of the Services, and performance dates for the completion of such Services, to be performed by the Contractor under this Call. In no event shall the amount paid to the Contractor for the Services provided to City by the Contractor under this Call, including all fees or pre-approved costs and/or expenses, exceed fifty six thousand six hundred forty six dollars (\$56,646.00), subject to budgetary appropriations.

The Parties acknowledge and accept the terms and conditions of this Call as evidenced by the following signatures of their duly authorized representatives.

**CITY OF SANTA CLARA, CALIFORNIA,
a chartered California municipal corporation**

Approved as to Form:

HELENE L. LEICHTER
City Attorney

Attest:

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City Clerk

By: _____
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2008 Energy Efficiency Program Evaluation Plan

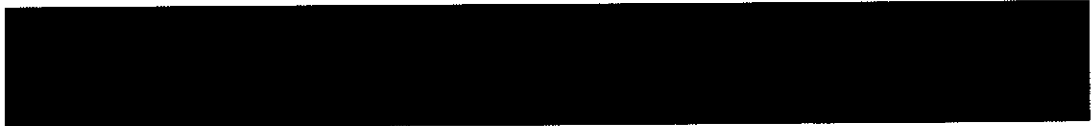
Submitted To:

Silicon Valley Power

August 14, 2008



SUMMIT BLUE
CONSULTING, LLC



Submitted to: Silicon Valley Power

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1 UTILITY OVERVIEW

Two legislative bills (SB1037 and AB2021) were signed into law a year apart. SB1037 requires that the Publicly Owned Utilities (POUs), similar to the Investor Owned Utilities (IOUs), place cost effective, reliable, and feasible energy efficiency and demand reduction resources at the top of the loading order. They must now procure 'negawatts' first. Additionally, SB1037 (signed September 29, 2005) requires an annual report that describes the programs, expenditures, expected energy savings, and actual energy savings.

Assembly Bill 2021, signed by the Governor a year later (September 29, 2006), reiterated the loading order and annual report stated in SB1037 as well as expanding on the annual report requirements. The expanded report must include investment funding, cost-effectiveness methodologies, and an independent evaluation that measures and verifies the energy efficiency savings and reductions in energy demand achieved by the energy efficiency and demand reduction programs. AB2021 additionally requires a report every three years that highlights cost-effective electrical and natural gas potential savings from energy efficiency and established annual targets for energy efficiency and demand reduction over 10 years.

The legislative reports require both an on-going assessment of what is occurring within the programs along with a comparison of how much possible savings are left within the POU service territory. The goal of this 2008 Energy Efficiency Program Plan is to assist Silicon Valley Power to meet these requirements. This plan provides guidance and recommends Evaluation, Measurement, and Verification (EM&V) activities that will help standardize and streamline the reporting process in order to meet the legislative requirements.

This plan identifies recommended EM&V actions based on information gathered from staff interviews, a review of existing utility records, databases, and marketing materials. Based on this review, it is recommended that the following EM&V activities be conducted:

1. Review SVP's program tracking systems.
2. Verify the savings attributable to SVP's non-residential program as a whole but particularly lighting, HVAC, motors & VFDs, and other process measures. This will be done differently depending on the type of measures evaluated, ranging from a review of engineering calculations, to short-term metering, to billing analysis.
3. Verify installation of measures through on-site inspections.

1.1 General Utility Background Information

Santa Clara's municipal electric utility (Silicon Valley Power) is an enterprise of the City of Santa Clara, and was established in 1896. On a not-for-profit basis, Silicon Valley Power owns power generation facilities, has investments in joint ventures that produce electric power, and trades power on the open market. These efforts are directed toward ensuring its retail customers—the citizens, organizations and business of the City of Santa Clara—a highly reliable source of electric power at low, stable rates.

Silicon Valley Power (SVP) serves 51,111 customers. However, the largest portion of its electrical sales is to its 1,932 industrial customers (87%) while 9% sales are to residential customers. SVP is projecting an average increase of 7.8% annually in sales.

The utility's peak demand is 486.5 megawatts, which occurred on July 25, 2006. The utility has a 69% load factor. The annual energy use was 2,879 gigawatt-hours in 2006. SVP owns power generation facilities. More than 30% of its power comes from geothermal, wind, and other eligible renewable sources.

SVP is located in California Title 24 Climate Zone 4, in the Central Coastal Range of California. This area is still influenced by the ocean, which keeps temperatures from hitting more extreme highs and lows.

Table 1: Temperature Reference Points for Silicon Valley Power¹

Base Temp: 65F	San Jose
Heating Degree Days (HDD)	2,335
Cooling Degree Days (CDD)	574

1.2 Key Customer Markets

SVP's Public Benefit Programs are separated into residential and business programs, with the majority of funding toward the business sector since that is the customer class that represents about 87.4 percent of the sales. Total program expenditures are about \$5.7 million per year. Savings of more than 165 million kilowatt-hours were achieved in the first year of the program in 1998. Total program cost for energy efficiency programs in fiscal year 2006-2007 was \$3,602,097 (\$4,741,636 on all public benefit programs), resulting in 1,182 kilowatt demand reduction and 10,889 gigawatt-hour energy reductions. Since 1998, total program costs for all public benefit programs were \$42,697,546, resulting in 896,104 gigawatt-hours of reductions.

1.3 Efficiency Programs Offered

SVP's goals and objectives for implementation of energy efficiency programs include providing:

- Cost-effective programs to lower energy use,
- Programs that create value for the community and meet all applicable legal requirements,
- Programs that assist Divisions and City Departments in achieving optimal energy efficiency at City facilities and assist in implementing new energy related technologies for the benefit of the City and community,
- Programs to support renewable power generation that increase resource diversity and minimize adverse environmental impacts from electric generation and operation of the electric system, and

¹

http://www.pge.com/includes/docs/pdfs/about/edusafety/training/pec/toolbox/arch/climate/california_climate_zone_11.pdf

- Programs that support emerging technology development and implementation,
- Programs that assist low-income residents in paying their electric bills and installing energy efficient appliances and other measures, and
- Determination of the best energy programs to offer Santa Clara customers by collecting input from community organizations, businesses and other City departments.

1.3.1 Program Summaries

Current Non-Residential Customer Programs:

- **“Optimal Power Use Service” (OPUS)**sm: Provides installation support and financial rebates to small and medium sized businesses to facilitate upgrades to more efficient lighting and air conditioning systems.
- **Business Audits**: Free energy efficiency audits to business customers.
- **Rebates**: A comprehensive portfolio of energy efficiency rebates (for purchase and installation of energy efficient lighting, motors, air conditioners, motion sensors, programmable thermostats, new construction, and customized energy efficiency installations).
- **Business Energy Information**: Management information on energy usage through 15-minute interval meters, Itron's ‘EEM Suite’ software, training, and other sources.
- **Energy Innovation Program**: This program encourages businesses to demonstrate new products and product applications not yet commercially viable in today's marketplace, install energy efficient technologies not generally known or widely accepted, yet show potential for successful market growth, successfully apply energy efficiency solutions in new ways, or introduce energy efficiency into industries or businesses that are resistant to adopting new technologies or practices.
- **LEED Rebate for Energy Efficient Building Design**: If a building meets LEED criteria and exceeds Title 24 energy requirements by at least 10 percent, the business can receive a rebate of up to \$47,500.
- **Compressed Air Management Program (CAMP)**: Provides assistance to large commercial and industrial facilities to assist them in upgrading poorly functioning and inefficient compressed air systems.
- **Retrocommissioning (RCx)**: Provides commissioning and retro commissioning services to data centers, commercial buildings, educational facilities, and hotels.
- **“Keep Your Cool” Program**: Provides service through a third party to repair or replace broken refrigeration door gaskets and to install new strip curtains for businesses in Santa Clara.
- **Public Facilities' Energy Efficiency Program**: SVP provides technical assistance and financial incentives for the expansion, remodel, and new construction of City of Santa Clara buildings. Included in this program are higher levels of rebates for qualifying equipment, energy management assistance, and a small budget for retro commissioning.
- **Business Solar Photovoltaic Rebate**: Provides financial incentives for the installation of solar systems at business sites. Businesses can now receive rebates starting at \$3.00 per output watt up to a total of \$300,000 per customer for systems up to 100 kilowatts. The former rebate was \$2.50 per watt for a maximum of \$125,000 or a 50-kilowatt system. Businesses installing systems between 100 kilowatt and one megawatt are eligible for a Performance Based Incentive of \$0.40 per kilowatt-hour. Businesses are required to complete an energy audit in order to receive a rebate, as is the case with the statewide California Solar Initiative.

Current Residential Customer Programs:

- **Residential In-Home Energy Audits and Education**: Through this technical support program, SVP staff provided on-site audit analysis, energy efficiency recommendations and distributes

energy saving items (four compact fluorescent lights, "lime lites," and programmable thermostats). The Solar Explorer and SVP information booth participate in major city events, providing education on energy efficiency and solar electric generation systems. In collaboration with the Santa Clara Police Department, compact fluorescent light bulbs (CFLs) and educational materials are distributed to residents participating in the National "Night Out" Program in August.

- **Residential Appliance Rebates:** Rebates encourage residents to purchase and install Energy Star® labeled refrigerators and recycle their old refrigerators.
- **Refrigerator & Room Air Conditioner Recycling:** Rebate for recycling old refrigerators and room air conditioners.
- **Residential Attic Insulation Rebates:** These rebates encourage the installation of attic insulation by providing incentives for both single-family and multi-family units. All homes are inspected to ensure installation has been completed.
- **Neighborhood Solar Program:** SVP customers have the option to pay into a special fund to support the installation of solar electric systems at community buildings. The second installation at Valley Village Retirement Center was completed in April 2007. Industrial customers provided \$10,000 of the funding for this installation. The next installation is scheduled for FY08/09 and will be installed on the Bill Wilson Center.
- **SVP Plug-ins Catalog:** Energy efficient product catalogs are delivered four times per year to residents. Monthly promotions are available to customers who order on the web. The printing of catalogs and fulfillment of customer orders is done by Energy Federation, Inc.
- **Rate Assistance Program:** Qualified low-income customers receive a discount on their electric bill (low-income program).
- **Low-Income Refrigerator Replacements:** Replaces old, energy wasting refrigerators for eligible low-income residents with new, energy-saving appliances.
- **Residential Solar Photovoltaic Rebate:** Provides significant financial incentive to residential customers for installation of solar systems. Customers receiving the rebate are required to also complete an energy audit, as is the case with the statewide California Solar Initiative. The rebate was increased from \$3.00 to \$4.50 per watt, up to a maximum system size of 10 kilowatts. The prior maximum system size was 3 kilowatts.

2007 Program Summary

Table 2 summarizes the kW, kWh and program costs for SVP's 2007 programs.

Table 2: 2007 Summary of SVP's DSM Programs

Program Sector	Net Annual Energy Savings (kWh)	Energy Savings % of Total	Net Peak Demand Savings (KW)	Demand Savings % of Total	Incentives (\$)	Mktg, E M & V, and Admin Cost (\$)	Total Program Costs (\$)
Residential Appliances/Electronics	5,585	0.1%	1	0.1%	\$4,560	\$393	\$4,953
Residential HVAC	7,239	0.1%	7	0.9%	\$13,056	\$42,198	\$55,254
Residential Lighting	284,303	2.6%	81	10.3%	\$3,116	\$122,461	\$125,577
Residential Refrigeration	697,418	6.4%	108	13.7%	\$24,860	\$77,222	\$102,082
TOTAL RESIDENTIAL	994,545	9.1%	197	25.0%	\$45,592	\$242,274	\$287,866
Non-Res Process	3,541,648	32.5%	0	0.0%	\$526,127	\$462,394	\$988,521
Non-Res HVAC	2,381,757	21.9%	87	11.0%	\$561,808	\$342,988	\$904,796
Non-Res Lighting	3,204,154	29.4%	504	63.9%	\$404,135	\$473,734	\$877,869
Non-Res Other	767,125	7.0%	1	0.1%	\$167,169	\$249,283	\$416,452
TOTAL NON-RES	9,894,684	90.9%	592	75.0%	\$1,659,239	\$1,528,399	\$3,187,638
TOTAL	10,889,229		789		\$1,704,831	\$1,770,673	\$3,475,504

SVP's non-residential programs accounted for 75% of the net peak kW savings and over 90% of the energy savings. These non-residential programs also accounted for the majority of the program costs.

1.4 Evaluation Priorities

SVP's non-residential programs constitute the largest component of its DSM portfolio. The non-residential process (motors, VFDs, compressed air), lighting, and HVAC measures provided nearly equally large shares of the 2007 energy savings. Projected 2008 energy savings had these three groupings of measures still providing the bulk of energy savings but with HVAC measures becoming even more important. The residential sector provides important contributions, but with the dominant share of savings coming from the non-residential sector, the focus of this 2008 Energy Efficiency Program Evaluation Plan should be on SVP's non-residential programs; especially HVAC, process, and lighting measures.

Based on our assessment, it is recommended that SVP conduct the following EM&V activities.

1. Review of SVP's program tracking systems.
2. Verify the savings attributable to the non-residential programs. In particular, these would be non-residential process (motors, VFDs, compressed air), lighting, and HVAC measures. The impact evaluation method will be different by type of measure.
3. Verify installation of measures through on-site inspections.

2 EVALUATION PLAN

The primary objectives of an impact analysis are to assess gross and net demand and energy savings and the cost-effectiveness of the installed energy efficient equipment. An impact evaluation verifies measure installations, identifies key energy assumptions and provides the research necessary to calculate defensible and accurate savings attributable to the program.

2.1 Methods and Data Sources

A useful construct for thinking about the range of efficiency measures covered by the Silicon Valley Power Program is the International Performance Measurement and Verification Protocol (IPMVP). Table 3 presents a listing of the IPMVP protocols, the nature of the performance characteristics of the measures to which M&V options typically apply, and an overview of the data requirements to support each option. Our approach to selecting M&V strategies follows these guidelines.

Table 3: Overview of M&V Options

IPMVP M&V Option	Measure Performance Characteristics	Data Requirements
Option A: Engineering calculations using spot or short-term measurements, and/or historical data	Constant performance	<ul style="list-style-type: none"> • Verified installation • Nameplate or stipulated performance parameters • Spot measurements • Run-time hour measurements
Option B: Engineering calculations using metered data.	Constant or variable performance	<ul style="list-style-type: none"> • Verified installation • Nameplate or stipulated performance parameters • End-use metered data
Option C: Analysis of utility meter (or sub-meter) data using techniques from simple comparison to multi-variate regression analysis.	Variable performance	<ul style="list-style-type: none"> • Verified installation • Utility metered or end-use metered data • Engineering estimate of savings input to SAE model
Option D: Calibrated energy simulation/modeling; calibrated with hourly or monthly utility billing data and/or end-use metering	Variable performance	<ul style="list-style-type: none"> • Verified installation • Spot measurements, run-time hour monitoring, and/or end-use metering to prepare inputs to models • Utility billing records, end-use metering, or other indices to calibrate models

The engineering calculations used to estimate savings depend upon the type of measure being implemented. For the process and lighting measures, our recommendation is that a combination of M&V Options "A" and "B" is the most appropriate method for this impact evaluation. In the case of HVAC measures, Option "D" may be necessary. HVAC measures have the greatest level of *ex ante* energy savings estimate uncertainty because they are based on savings estimates derived from building simulation modeling with the building characteristics being an average across all vintages and building types. The methodology recommended for the HVAC measure analysis is a multi-variate regression statistically adjusted engineering (SAE) model that uses of pre and post program participation billing data along with a number of other potential explanatory variables. Among these other variables would be the

ex ante estimates for the specific measures installed as well as weather data and other relevant participant data that may be available from the program tracking database.

Upon completion of the SAE model assessment, SVP will have defensible impact estimates of energy savings for each measure included in the analysis. Based on the analysis, the *ex ante* energy savings estimates will be adjusted by regression coefficients and then normalized to normal Santa Clara weather. These *ex post* energy impact estimates can replace the *ex ante* values in all future planning.

SVP's non-residential projects are divided into four categories: HVAC, lighting, motors and VFDs, and other projects. Of these, lighting measures rarely require metering since the usage of these systems is well documented, although verification of controls using run-time measurements may be useful in some cases. Variable speed drives differ greatly for each installation and metering is usually necessary in order to accurately determine savings. In many cases, pre-installation metering can be used if conditions have not changed. However, in cases where the demands on a system have been affected by the installed measures post-installation metering may also be called for. Easily accessible data from the program database, such as system horsepower or tonnage, number and type of lights, and system control specifications will be used as inputs for engineering calculations. Additionally, pre-and post-installation metered data will be used where applicable.

In order to accurately evaluate a typical lighting installation, all that is needed is a list of fixtures removed, fixtures installed, and operational hours. Standard wattages are available for most fixtures and can be used in a straightforward calculation of savings. Standard hour reductions are also available for occupancy sensors. In the event that significantly higher reductions are expected in an area, typically three weeks of on/off logging are required to accurately confirm the estimated savings. Daylight sensor savings can be calculated using a combination of operating hours and standard weather data for the installation location.

Variable speed drives typically require a week of logged data to accurately determine savings. However, there are instances of simpler variable speed drive systems where spot measurements will sometimes be adequate to estimate savings. A week of logging post-installation is generally advisable, although estimates using pre-installation logging along with fan or pumping curves can also be reasonably accurate in many cases. Savings due to simple motor replacements can typically be calculated with only spot measurements and manufacturers' data.

Reviewing the list of projects and the four energy audit reports supplied by SVP has also raised some potential issues that will need to be reviewed in more detail if these or similar studies are included in the sample population. Specifically, the total kWh savings and rebate amounts do not appear consistent with the stated incentive rates provided by Silicon Valley Power. The average rebate for HVAC measures in the 2006-7 program years appear to be \$0.22/kWh in contrast to the specified rate of \$0.17/kWh. Lighting shows an average incentive of \$0.10/kWh as opposed to the stated incentive of \$0.06/kWh. This could be due to a change in incentive structure or some prescriptive rebates, or simply the project is part of a program that has special higher incentives, such as the OPUS program. We will want to clarify these issues during the program review.

2.2 Evaluation Tasks

Listed below are the proposed tasks for performing the evaluation work.

Task 1: Review Tracking Systems

Based on our preliminary review of the current tracking system, the process evaluation could identify ways to simplify and streamline the data tracking process currently used.

Task 2: Identify Impact Evaluation Sample and Obtain Metered Data

The second evaluation priority, as identified in Section 1.4, is to verify the savings attributable to the Silicon Valley Power program. As discussed in Section 3.1, it is our recommendation that using engineering calculations with a combination of metered data and stipulated performance parameters, is the best evaluation strategy for non-HVAC measures and a SAE billing analysis.

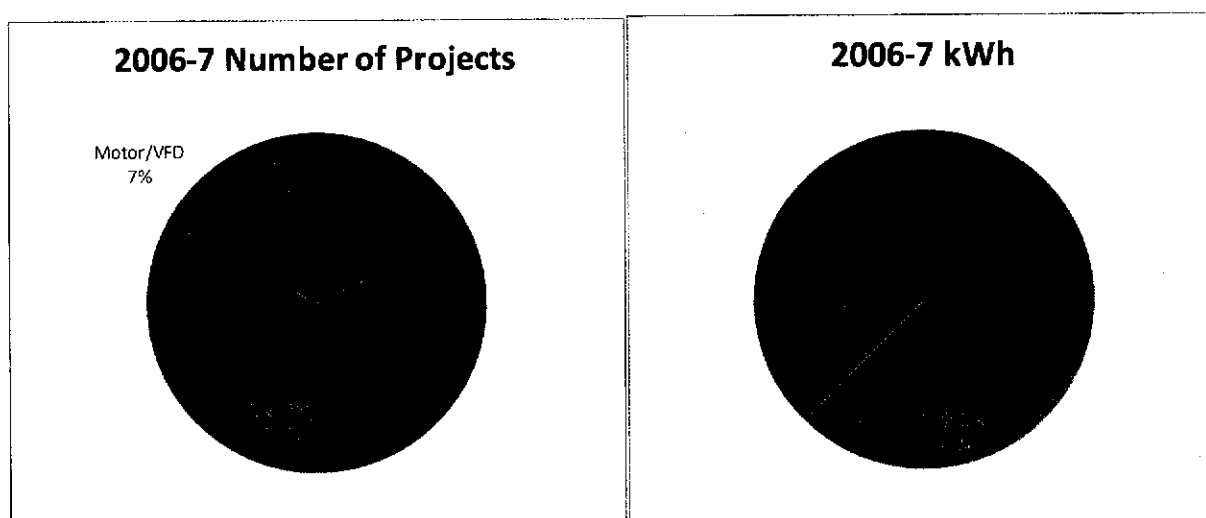
Between July 2006 and the end of June 2007, there were 158 measures installed through SVP program. For sampling purposes, the FY2007 number of participants and estimated energy savings will be used as a guide to create a verification plan. To keep costs reasonable, it is recommended that a sample population be drawn from the universe of installations sufficient to achieve a level of precision and confidence of 80% +/-20%. Using a universe of approximately 158 installations, a sample of about 10 sites would be included in the analysis. Because of the variability among types of measures, it is recommend that the samples be randomly chosen from within each measure type, but that the number of samples from each measure type, be weighted by the amount of estimated energy savings. Based on Figure 1, the sampling would include:

- Lighting – three sites
- HVAC – three sites
- Motors/VFDs – three sites
- Other – one site

Table 4: Overview of Measures Installed During 2006-07 Program Year

category	# projects	kWh	rebate totals	% projects	% kWh	% rebate	\$/kWh
HVAC	28	3705575	\$805,913.80	18.2%	31.8%	46.8%	\$0.22
Lighting	100	3568746	\$370,098.31	64.9%	30.7%	21.5%	\$0.10
Motor/VFD	11	2803325	\$295,330.04	7.1%	24.1%	17.1%	\$0.11
Other	15	1561651	\$251,491.90	9.7%	13.4%	14.6%	\$0.16
total	154	11639296	\$1,722,834.05	100%	100%	100%	\$0.15

Figure 1: Overview of Measures Installed During 2006-07 Program Year



Task 3: Installation Verification

The installation of each measure has already been verified by SVP (or its contractor) before the incentive was issued. The evaluation consultant will insure that this verification information is included in SVP program tracking database. However, because of the complexity of measure installations at many sites and the small number of sites to be evaluated, an on-site verification is recommended.

Task 4: Calculate Gross Energy and Demand Impacts

The engineering analysis normalized to predict kWh and kW savings will be used to estimate the impact from each installation. A weighting factor will be used to normalize the results to the full participant population. Demand impacts will be based on a kW/kWh ratio the current *ex ante* estimates or from an engineering model such as the one available from Washington State University (<http://www.energyexperts.org/fuelcalc/default.asp>).

Task 5: Evaluation Report

The evaluation consultant will issue a final report to the utility summarizing the results from the process and impact evaluations and describing any recommendations that come from the evaluations. These recommendations will assist Silicon Valley Power in meeting the AB2021 requirements and will be submitted to the California Energy Commission (CEC). The final report will include:

E: Executive Summary

1. Introduction and Selected Evaluation Issues
2. Program Overview
 - 2.1. Program Objectives
3. Evaluation Plan
 - 3.1. Research Issues and Objectives
 - 3.2. Methods & Data Sources
 - 3.3. Sample Design
4. Evaluation Results
 - 4.1. Findings
 - 4.2. Recommendations
5. Evaluation Based Recommendations

3 EVALUATION PLAN TIMING

The 2008 Energy Efficiency Program Evaluation will begin in early October of 2008 and end in January of 2009. Fortunately, many of the measures that will be evaluated (the non-HVAC measures) are not dependent on long pre and post billing or metering data.

It is anticipated that about ten program participants will be part of the survey M&V effort. The participant population can be segmented into HVAC measure and non-HVAC measure groups. Evaluation efforts for the non-HVAC measure participants can begin as soon as FY 2008 ends. The HVAC measure participants can be evaluated after at least six months of billing data is available or a sub-metering plan is developed.

4 PHASE II BUDGET

The budget to perform the evaluation is based on a review of the current tracking system and impact evaluations performed for ten non-residential projects, as identified in Task 2. The overall budget is a not to exceed \$56,646.

Table 4: Phase II Budget

Personnel	Project Function	Rate	Task 1 Review Tracking System	Task 2 Identify Impact Evaluation Sample and Obtain Billing Data	Task 3 Installation Verification	Task 4 Calculate Gross Energy & Demand Impacts	Task 5 Process and Impact Evaluation Report	Total Hours	Total
Kevin Cooney	Principal	\$195	0	0	0	0	2	2	\$390
Gary Cullen	Project Manager	\$165	0	4	2	16	40	62	\$10,230
Ryan Firestone	Engineer	\$130	0	0	8	60	24	92	\$11,960
Mike Yim	Engineer	\$120	0	0	16	40	12	68	\$8,160
Nick Bearman	Engineer	\$95	0	0	16	40	12	68	\$6,460
Mary Klos	Research Analyst	\$125	0	20	0	64	16	100	\$12,500
David Bluestein	Analyst	\$90	0	0	24	0	0	24	\$2,160
Katherine Johnson	Research Analyst	\$125	24	0	0	0	8	32	\$4,000
Administrative Staff	Admin	\$53	0	0	0	0	2	2	\$106
			24	24	66	220	116	450	-
Other Direct Costs									
Travel, Food & Hotel		\$1			\$680			-	\$681
	Total Labor		\$3,000	\$3,160	\$6,970	\$27,040	\$15,796	-	\$55,966
	Total ODCs		\$0	\$0	\$680	\$0	\$0	-	\$680
	Total Cost by Task		\$3,000	\$3,160	\$7,650	\$27,040	\$15,796	-	\$56,646